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MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole # 21-07-06

Borehole Information

Farm : BX	**Tank :** BX-107	**Site Number :** 299-E33-222
N-Coord : 45,355	**W-Coord :** 53,450	**TOC Elevation :** 656.80
Water Level, ft :	**Date Drilled :** 9/30/1973	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:

Borehole 21-07-06 was drilled in September 1973 to a depth of 100 ft with 6-in. casing. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. A driller's log was not available for this borehole, so data from Chamness and Merz (1993) were used to provide construction information. Although no information concerning grouting or perforations was available, it is assumed that the borehole was not grouted or perforated since this was not a routine practice during the 1970s drilling campaign. The top of the casing, which is the zero reference for the SGLS, is about 0.5 ft below the ground surface.

Equipment Information

Logging System : 1B	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 02/1997	**Calibration Reference :** GJO-HAN-13	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	06/18/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	101.5	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	98.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	2	**Log Run Date :**	06/18/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	99.0	**Counting Time, sec.:**	100	**L/R :** R **Shield :**	N
Finish Depth, ft. :	41.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	3	**Log Run Date :**	06/19/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	42.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	23.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Log Event A

Log Run Number :	4	**Log Run Date :**	06/19/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	24.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	20.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	5	**Log Run Date :**	06/23/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	21.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	6	**Log Run Date :**	06/23/1997	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	15.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Analysis Information

Analyst : A.W. Pearson

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 11/18/1997

Analysis Notes :

This borehole was logged by the SGLS in six log runs. Five log runs were required to complete the borehole. The sixth log run was a repeat. All of the pre-survey and two of the post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from the accepted spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The only man-made radionuclide detected around this borehole was Cs-137. Cs-137 contamination was detected from the ground surface to about 26 ft, 32.5 to 38 ft, and 48 to 101.5 ft. The total count rate exceeded the SGLS capacity to produce a usable spectrum from 26 to 32.5 ft and 38 to 48 ft. The detector was saturated because of high gamma activity along the remaining intervals of the borehole.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Meaningful intervals of KUT log data were not acquired because of the high dead time throughout most of the borehole.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank BX-107.

Log Event A

Borehole 21-07-06

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A rerun plot includes the man-made and natural radionuclide assays from the original log runs plotted against the same from the repeat log run. A plot of the shape factor analysis results is also included.